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ABSTRACT

A nonverbal training module for a Teaching Laboratory was developed for and tested with secondary teacher-candidates enrolled in the University of Texas at Austin teacher education program. The unit, employing an awareness approach, was administered to 17 students in the experimental group immediately preceding the last of a series of required verbal teaching tasks. Curriculum materials were controlled for a cognitive gain measure. An objective observation system was developed for low-inference data. Test scores and nonverbal behaviors of experimental students were contrasted with those of another group of students (N=20). The training unit was effective in modifying four of 20 hypothesized changes in nonverbal behaviors. Further research concerning the most effective classroom nonverbal behaviors and the feasibility of teaching those behaviors appears warranted. (Author)

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AN EMPIRICAL STUDY OF THE ACQUISITION OF NONVERBAL TEACHING BEHAVIORS BY SECONDARY TEACHER CANDIDATES IN A TEACHING LABORATORY

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R. Lewis Hodge

Purpose

This study was an attempt to determine if the nonverbal teaching behaviors of secondary teacher-candidates enrolled in an introductory course in teaching (embodying a Teaching Laboratory component) could be modified by exposure to a nonverbal communication training unit. The verbal teaching behaviors of teacher-candidates have been modified in the same Teaching Laboratory (hereafter, TL) in which this study was conducted, presumably in desirable and effective ways (Davis and Smoot, 1969; Davis and Morse, 1970). The modification of teacher nonverbal behavior seemed equally desirable and feasible but, as yet, untested. The training unit was based on an awareness approach. An assessment of that training was made in terms of peer achievement scores over controlled curriculum materials and scores from an objective, nonverbal communication observation system.

Nonverbal communication, as used in this study, includes all movement which can be visually percieved; it does not include personal, physical features, e.g., complexion, haircut, ethnic features; it does not include any kind of vocal, or audible, communication although Webster's International Dictionary and some researchers do include

vocal quality and nonlanguage utterances, e.g., nasal inflections, "Hmmm," in their definitions of nonverbal.

Teachers communicate both verbally and nonverbally, but most teacher communication research and investigation have been concerned with teacher verbal communication. Nonverbal communication has not been studied nearly so extensively as verbal communication, probably because of the difficulties in observing and interpreting the phenomena (Fenichel, 1953; Ruesch and Kees, 1956; Duncan, 1969).

However, nonverbal communication has proven observable (French, 1970; Galloway, 1971) even without interference from verbal communication (Birdwhistell, 1970; Grant and Hennings, 1971). Nonverbal communication is a dimension of communication separate and distinct from verbal communication, although overlap is readily acknowledged (Heger, 1968; Duncan, 1969; French, 1970; Galloway, 1971). Therefore, nonverbal communication research is feasible if for no other reason than the phenomena are identifiable and observable.

Many researchers have thought verbal behavior to be closely related to cognitive aspects of the classroom even though the majority of the studies of teaching behaviors have been directed toward the affective rather than the cognitive (Medley and Mitzel, 1963; Gage, 1966; Rosenshine, 1971.

There is some evidence that nonverbal communication may be more closely related to the affective domain than is verbal behavior (Davidson and Gerhard, 1960; Smith, 1961; Galloway, 1970). To the extent this position is true, then studies of classroom phenomena, e.g., classroom atmosphere, teacher dynamism, teacher-student interaction,

might be better or more adequately understood or explained through an analysis of nonverbal communication than through verbal communication. Given its distinctive characteristics and implied applications, nonverbal communication deserves recognition as an appropriate set of teaching behaviors.

Verbal communication has been dichotomized into verbal teaching tasks. Teaching Laboratories have proven proper settings in which teacher-candidates might actually practice and acquire those verbal teaching tasks. The TL setting appears to be an equally appropriate setting for practicing nonverbal teaching tasks. This nonverbal study attempted to follow a series of teacher-candidates' verbal studies conducted in the Teaching Laboratory at The University of Texas at Austin. (See Davis and Smoot, 1969; Davis and Morse, 1970; Davis and Rogers, 1970; and Davis and others, 1970).

RELATED LITERATURE

Two factors were especially significant to the progress of this research: (1) the development of a nonverbal training unit, and (2) the development of an objective observation system. Both factors had to answer the question, "What kinds of nonverbal behaviors are worth investigating?"

The Nonverbal Training Unit

Heeding the advice of Travers (1965) and taking the liberty suggested by Saettler (1968), a brief media presentation(12 minute slide-tape) was assimilated to initiate interest and standardize the basic information included in the training unit. It was immediately followed by a sequence of prescribed leader-participant interactions, which might be labelled

"awareness approach" (Schindler-Rainman, 1968; Galloway, 1970; Golembiewski and Blumberg, 1970). The third phase of the training unit was a microteaching experience (see Roberson, 1969; Pancrazio and Johnson, 1970).

The development of an appropriate set of nonverbal behaviors to teach was compounded by the very subjective nature of nonverbal communication and the matching of generally appropriate behaviors with such variables as group size, cultural and regional differences, and individual personalities. However, a variety of research, observation, and theorizing from several branches of social science support preferred dimensions of nonverbal behavior as well as specified acts which appear to be effective. The use of continuums was deemed an effective way of presenting the affective characteristics of nonverbal (Heger, 1968; Galloway, 1970; Teresa and Francis, 1972). The continuums of encouraging-inhibiting, alert-inattentive, and reinforcing-incongruent were chosen from the available ones (Goffman, 1962; Galloway, 1970).

Five facets of behavior were selected for presentation. The first, body communication, (presented separately as spatial relationship and body position), is related to the social settings of various cultures (Hall, 1959), affect group interaction (Steinzor, 1950) and one-to-one interviews (Mehrabian and Ferris, 1967a), and may be a factor in effective teaching (Rosenshine in Gage and Associates, 1971). The literature suggests that teacher body communication which is directed toward students may be more effective than body communication directed away from students, and that teacher movement may be helpful. Arm and hand communication, the third facet, has been incorporated into dance, custom, and religion (Critchley, 1939). Its early development in children has

been pointed out by Ruesch and Kees (1956). Its continued employment in the classroom has been noted by Mitzel and Rabinowitz (1952), Galloway (1970), and Grant and Hennings (1971), among others. Due to its complexity, the available literature says little about preferred gestures. Rosenshine's findings (Gage and Associates, 1971) that the amount of gesturing significantly favored more effective teachers did not attempt to say what were effective gestures, stating that they " . . . may have the effect of arousing or focusing attention" (p. 205). However, given preferred body positions of facing the students, one might infer that arm and hand gestures which were student directed might compliment directed body positions. Facial communication, the fourth facet, is readily interpretable. Levitt (1964) found that emotional meanings are more accurately communicated by facial expressions than vocal ones; college students were found capable of conveying to other students via facial expression along, their emotional intent, especially with regard to happiness, fear, love and determination (Thompson and Meltzer, 1968); and Mehrabian and Ferris (1967b) determined the facial component of the communication act receives approximately 3½ times the weight received by the vocal component. The positive effects of the specific behaviors of smiling and nodding is rather well substantiated in studies of human social development (e.g., Thompson, 1941; Spitz and Wolf, 1946; Gray, 1958; and McCandless, 1966). They continue to be effective in interviewing situations (Rosenfeld, 1967), inkblot testing (Wickes, 1956), and the communication of nursery school teachers (Harrington, 1955). The evidence indicates that teacher classroom communication would likely be enhanced by affirmative nodding and smiling when applied discriminately.

Eye communication is the fifth facet. Eye contact is a uniquely sociological function (Simmel, 1969), " . . . is a component of intimacy and is equivalent to physical proximity"(Argyle and Dean, 1965), can have two quite different meanings depending on both personality and the situation (Exline, 1963), may be a discriminating factor between introverts and extroverts (Bakan, 1971), and was found to be a factor in dyadic interactions of black and white, male and female educators with black and white, male and female strangers (Powell and Dennis, 1972). With regard to teacher communication, Hodge (1971) has concluded that "The eyes can be used effectively to communicate not only awareness but more importantly, personalized communication" (p. 276). As with other facets of nonverbal communication, student directed eye contact would appear desirable; overuse would probably diminish its effectiveness. A given teacher in his/her classroom situation is in the best position to determine how much of it should be used and with whom.

The five facets are not clearly supported nor defined for teacher utilization. Such factors as spontaneity (Grant and Hennings, 1971), common sense use (Galloway, 1971), and intuitive knowledge (Galloway, 1959) may be more significant factors than a formal training unit. These factors were acknowledged in the nonverbal training unit.

The Observation System

There is a limited number of observation systems for teacher nonverbal behavior. The Galloway System (Lail, 1968) is based on the verbal system, the Flanders System. Galloway himself has proposed alternative approaches ranging from categorical to narrative systems. Anthropologist Birdwhistell (1970) has recommended a comprehensive system of symbols

for recording observable, overt behaviors, without regard to their social implications within the observed setting. Other social scientists have limited their studies to a few select behaviors (Ekman, 1958), focusing, for example, upon teacher smiles (Harrington, 1955), eye contact (Exline and others, 1964), and body position (Ekman, 1964; Rosenshine, 1970).

There are valid reasons for employing narrative observation systems (e.g., Johnson, 1971; Cohen and Stern, 1970; Ruesch and Kees, 1956; Goffman, 1963; and Fenichel, 1953).

Since this study was an empirical one, the author deemed it appropriate to use a system that would collect empirical data. In the absence of any known objective systems, one was developed inductively by this researcher. Approximately 20 hours of videotape were observed without the audio portion. Distinctive categories were identified. Combined with the available knowledge of effective nonverbal behaviors, a system was devised which would provide an objective assessment of same.

The system is comprehensive enough to collect data for a variety of teacher nonverbal communication (67 discreet teacher behaviors); offers explicit behaviors suitable for correlating to other teacher or student variables; and lends itself to gross interpretations (narrative type) and useful inferences because of possible groupings of behaviors.

METHOD

Sample and Design

One Experimental Group and two Contrast Groups of 17, 20, and 17 secondary teacher-candidates, respectively, attending the Teaching Laboratory Course at the University of Texas at Austin were established. The Experimental Group and one Contrast Group (the Participatory Contrast

Group) were given two sets of curriculum materials to teach. The Experimental Group was also provided nonverbal communication training. The other Contrast Group, the Non-participatory Group, was given neither curriculum materials nor nonverbal training: they served as a limited kind of "base line" with which to compare the other two groups.

The introduction of curriculum materials (two units of Latin American social studies) serve three functions: (1) to disguise the real purpose of the experiment, suggesting that the experiment was related to the materials, thus raising possible Hawthorne effects in both the Experimental and Participatory Contrast Groups; (2) to provide additional data, i.e., test scores, another dependent variable to analyze for correlations with nonverbal scores; and (3) to double the number of Ss.

Immediately following the introduction of the materials, the Experimental Group received the nonverbal communication training unit (approximately 1½ hours). The Participatory Group received curriculum materials but no training. The next scheduled microteach was the source of all data. Achievement tests were administered after each affected S microteach, and the affected microteaches were transferred to a master tape for subsequent coding.

Data Collection

Peer Achievement Test Scores. Tests were ten item--multiple choice. The average score of each S's peers was his Peer Achievement Test Score. Test coefficient reliabilities were .60 for Curriculum Materials I and .68 for Curriculum Materials II. Nonverbal Behavior Scores. Data for the 20 nonverbal dependent variables were collected with the objective, low-inference, nonverbal observation system which was inductively developed prior to, but for use in, this experiment. A Spearman's Rho

correlation coefficient of .95 for the two coders was obtained both preceding and following data collection. The basic data are frequency counts made every 15 seconds on two seconds of observation. There are seven basic categories containing several sub-categories. Attachment 1 is a code sheet for the system. Tallies were made in the proper sub-categories. The number of sub-categories used in a basic category determined a Versatility score. Some sub-categories have been identified as preferred sub-categories: these Nonverbal Preferred Scores are the total number of tallies in the preferred sub-categories divided by the total tallies for the basic category. The 20 nonverbal scores (eight versatility and 12 preferred scores) are described in attachment 2.

Rationale for selection of the 20 nonverbal scores is based on the distinctiveness of the categories and the findings of various social science research, observation, and theory which have indicated that these behaviors are significant. (See the section on Related Literature.)

RESULTS

Fixed-Effects Analysis of Variance of Nonverbal Teaching Behavior Scales

Main effects of the Curriculum Materials led to significant F-ratios in two Versatility variables, Total Hands and Total Head. Main effects of the Treatment led to significant F's in one Versatility variable, Total Mouth, and two Preferred variables, Hands Toward Ss and Smiling.

A summary of Means of Criterion Scores is provided in Table 1. For the significant interaction effect, mean scores for the Experimental

Table 1

Means of Criterion Scores for Experimental, Participatory, and Nonparticipatory Groups

Variable	Experimental Group			Participatory Group			Nonparticipatory Group
	Curriculum I	Curriculum II	Total	Curriculum I	Curriculum II	Total	
1	2.33	2.00	2.18	2.10	2.00	2.05	2.12
2	86.22	97.50	91.53	86.30	94.50	90.40	87.94
3	5.78	1.88	3.94	2.40	7.20	4.80	.82
4	2.11	1.88	2.00	1.60	1.60	1.60	1.88
5	4.67	4.00	4.35	3.90	3.00	3.45	4.18
6	8.78	11.75	10.18	7.30	2.70	5.00	10.29
7	6.67	9.25	7.88	4.40	2.50	3.45	9.29
8	6.11	4.13	5.18	5.20	4.20	4.70	5.47
9	7.44	10.13	8.70	5.50	1.90	3.70	
10	3.67	3.75	3.71	4.30	3.00	3.65	4.35
11	63.11	73.00	67.76	56.70	60.50	58.60	69.94
12	5.33	2.75	4.12	2.60	1.30	1.95	3.18
13	2.67	2.50	2.59	2.70	2.30	2.50	2.82
14	63.44	76.13	69.41	59.80	68.20	64.00	72.88
15	38.11	43.00	40.41	33.00	24.00	28.70	40.65
16	25.33	34.25	29.53	26.80	37.00	31.90	31.38
17	2.78	3.00	2.88	2.30	1.90	2.10	3.12
18	12.11	9.25	10.76	4.20	4.20	4.10	9.47
19	46.00	54.00	49.76	43.60	46.20	44.90	51.29
20	24.33	21.50	23.00	22.80	18.00	20.40	24.06
21	81.56	65.88	--	76.50	60.70	--	--

Note: Raw Data for Hypotheses 2, 3, 6, 7, 9, 11, 12, 14, 15, 16, 18, and 19 were multiplied by 100 to produce whole numbers instead of fractions; these data are percentage data. Data for the remaining hypothese are frequency data except Hypothesis 21, which is test score data rounded to nearest hundredth.

Group remained approximately the same across curriculum materials, but mean scores for the Participatory Group Ss using Curriculum Materials II were lower than Ss using Curriculum Materials I (see Figure 1). There was no significant, simple main effect for the Experimental Group across Curriculum Materials, but there was a significant, simple main effect for the Participatory Group across Curriculum Materials ($F<.01$) (Winer, 1962).

The results indicate that the experiment modified teacher-candidates' nonverbal behavior in six areas of both quantitative and "qualitative" nonverbal communication. Differences between users of Curriculum Materials I and II appeared to be related to differences in levels of difficulty. The fact that there were seven significant F-ratios (below the .05 level) out of a possible 63 was significant ($< .05$) in itself (Sakoda, Cohen, and Beall, 1954).

One-way Analysis of Variance of Nonverbal Teaching Behavior Scale Score

Each teacher-candidate's nonverbal scores were subjected to one-way analysis of variance. A summary of criterion scores is provided in Table 2. A comparison of the Experimental, Participatory, and Non-participatory Groups produced three significant F's (at the .05 and .01 levels) for three variables. The data are graphically depicted in Figure 2.

The findings indicate that the significant variation was due to the low group mean scores of the Participatory Group. The effects of the experiment may very well have reduced the nonverbal behaviors of the Participatory Group but not the Experimental Group.

FIGURE I

Interaction of Treatment and Curriculum Materials
with the Dependent Variable: Total Head

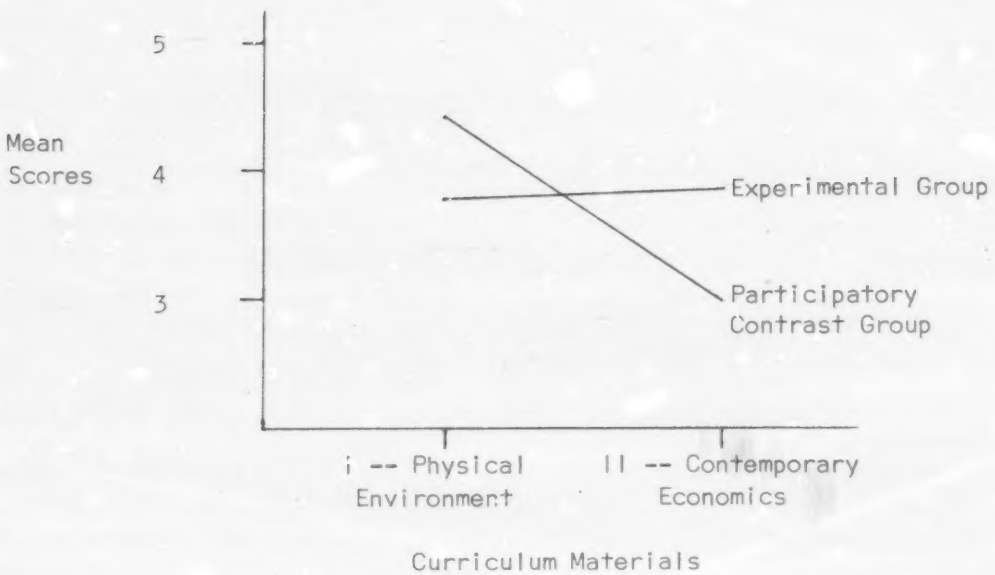


Table 2

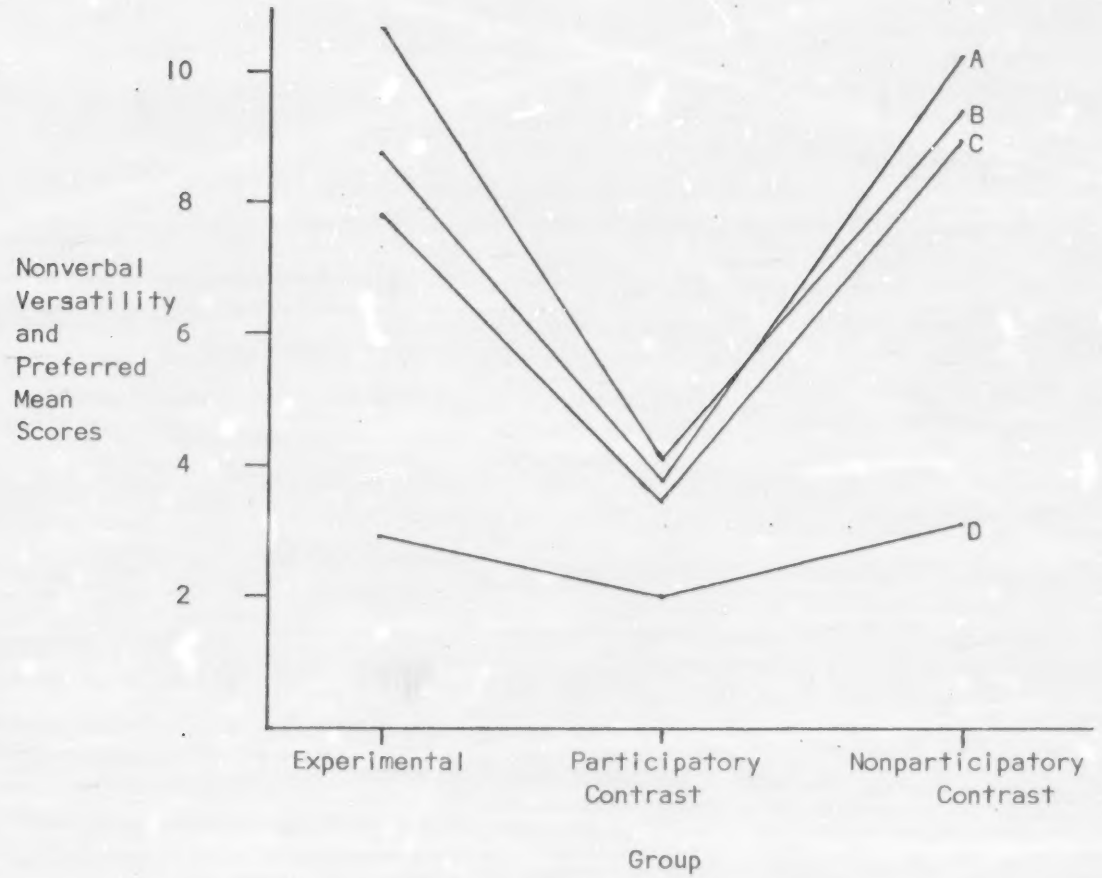
Summary of Analyses of Variance of Criterion Scores for Experimental, Participatory Contrast, and Non-participatory Group

Variable Number	Variable Description	MS	F-Ratio	p
1	Total Body Position	.07	.08	.92
2	Body Position, Toward Ss	57.50	.18	.84
3	Body Position, Standing Unerect Toward Ss and Sitting Unerect Toward Ss	78.11	1.01	.37
4	Total Spatial Relationship	.79	1.41	.25
5	Total Position of Arms	4.31	1.45	.24
6	Position of Arms, Toward Ss	172.63	2.05	.14
7	Position of Arms, Close to Body Toward Ss and Extended Toward Ss	174.70	3.31	.04
8	Total Position of Hands	2.82	.93	.40
9	Position of Hands, Toward Ss	222.53	3.78	.03
10	Total Position of Head	2.69	2.21	.12
11	Position of Head, Toward Ss	682.02	1.77	.15
12	Position of Head, Nod "YES"	21.90	1.52	.23
13	Total Position of Eyes	.50	.81	.45
14	Position of Eyes, Toward Ss	372.81	1.12	.33
15	Position of Eyes, Toward Ss Static	881.31	.63	.54
16	Position of Eyes, Toward Ss Moving	32.51	.03	.97
17	Total Position of Mouth	5.34	5.10	.01
18	Position of Mouth, Closed, Open, and Moving	235.12	2.97	.06
19	The combined Toward Ss Behaviors	209.47	1.97	.14
20	Total Behaviors	66.43	2.23	.12

Note: Raw Data for Hypotheses 2, 3, 6, 7, 9, 11, 12, 14, 15, 16, 18, and 19 were multiplied by 100 to produce whole numbers instead of fractions; these data are percentage data. Data for the remaining hypotheses are frequency data.

FIGURE 2

Group Means of the Experimental, Participatory Contrast, and Nonparticipatory Groups on the Dependent Variables Arms Close to Body and Extended Toward S, Hands Toward S, Total Mouth and Smiling



A = Hands Toward Ss
B = Smiling (nonsignificant, p = .0545)
C = Arms Close to Body and Extended Toward Ss
D = Total Mouth

Correlational Analysis of Nonverbal Teaching Behavior Scale Scores and Pupil Achievement Scores

No significant correlations were obtained for the nonverbal behavior scale scores and the dependent variable of Peer Achievement Scores. The findings suggest very little about effective or ineffective, desirable or undesirable nonverbal behaviors except to alert researchers to their possibility for further study.

Summary

Results from analyses of variance yielded ten significant F's and two near-significant F's for eight variables. Eight out of 21 variables with significant F's ($p = .05$ or less) is significant ($p = .001$) in itself (Sakoda, Cohen, and Beall, 1954). The eight significant variables are summarized in Table 3.

Discussion

The nonverbal training unit stressed both Versatility and Preferred nonverbal behaviors but emphasized Preferred. Three of the four significant F- ratios were found for Preferred nonverbal behaviors, one for a Versatility nonverbal behavior. Nonverbal training did have a significant effect upon so-called "personal" behaviors, which may be very in-grained behaviors. Of course, Ss may quickly return to their patterns of nonverbal behavior. One might speculate that additional nonverbal tasks would increase behavior changes.

The introduction of curriculum materials produced unexpected results. A comparison of the two groups teaching the curriculum materials--one

TABLE 3

Summary of Low Probability F-Ratios from Fixed-Effects One-Way Analyses of Variance

Hypothesis Number	Variable	Significant Analysis of Variance: Fixed-Effects	Significant Analysis of Variance: One-Way	Related Scores
7	Arms Close to Body and Extended Toward Ss	1		Lower Participatory Contrast Group scores
			*	Lower Participatory Contrast Group Preferred Scores
8	Total Hands	**		Lower Versatility Scores Curriculum II Ss
9	Hands Toward Ss	*		Lower Participatory Contrast Group Preferred Scores
			*	Lower Participatory Contrast Group Preferred Scores
10	Total Head	*		Lower Participatory Contrast Group Versatility scores using Curriculum II
17	Total Mouth	*		Lower Participatory Contrast Group Preferred Scores
			**	Lower Participatory Contrast Group Preferred Scores
18	Smiling	*		Lower Participatory Contrast Group Preferred Scores
			2	Lower Participatory Contrast Group Preferred Scores
20	Total Nonverbal Behavior	*		Lower Achievement Scores Curriculum II Ss
21	Peer Achievement Scores	3		Lower Achievement Scores Curriculum II Ss

* $p<.05$
** $p<.01$
1 $p = .0545$
2 $p = .0587$
3 $p = .004$

receiving nonverbal training and the other receiving no nonverbal training--with a third group having no knowledge of being included in the experiment (and receiving neither curriculum materials nor nonverbal training)-suggested some interesting possibilities regarding a possible Hawthorne effect. Participating in an experiment may have an inhibiting effect upon Ss' nonverbal behaviors, and nonverbal training may be effective in returning nonverbal behavior to normal. But such conclusions must remain speculative without the inclusion of another contrast group of Ss receiving nonverbal training but no prescribed curriculum materials (not administratively feasible for this study.)

The absence of correlated nonverbal behaviors and peer achievement was disappointing. Ironically, the curriculum materials introduced into this study appeared to influence the behavior it was designed to help measure.

Summary and Conclusions

A nonverbal training unit utilizing an awareness approach appears to have great potential toward modifying teacher nonverbal behavior. Fixed effects and one-way analyses of variance yielded significant F-ratios for four nonverbal behaviors: Hands Toward Ss (Preferred nonverbal), Total Mouth (Versatility nonverbal), Smiling (Preferred nonverbal), and Close to Body and Extended Toward Ss (Preferred nonverbal). Apparently, teacher-candidates can be trained to employ nonverbal behaviors said to be generally effective in a subsequent TL teaching episode. However, individual nonverbal behavior may be so

ingrained and well established that more through training may be necessary for greater modification than that realized by this study. And conclusions regarding what body of nonverbal behaviors constitutes a group of effective nonverbal behaviors must be investigated further. Even then researchers must consider the possibility that what makes a teacher effective may be his/her idiosyncratic behaviors rather than exhibition of a prescribed set of nonverbal behaviors.

Attachment 1

Code Sheet

Teacher's Name _____ Section _____

Coder's Name _____ Date _____ Total Nonverbal Score _____

Basic Cat. No.	Direction No.		Activity No. 1 Standing Erect	2 Standing Unerect	3 Sitting Erect	4 Sitting Unerect
1 BODY POSITION	1	Toward Ss				
	2	Undirected				
	3	Toward Os				
2 SPATIAL RELATION-SHIP	1	Behind desk	1 Left	2 Center	3 Right	4 Among
	2	In front				
3 POSITION OF ARMS	1	Toward Ss	1 Close to body	2 Extended	3 Crossed	4 Elbows extended, hands on waist
	2	Undirected				
	3	Toward Os				
4 POSITION OF HANDS	1	Toward Ss	1 Static	2 Describing/ Explaining	3 Other Movement	
	2	Undirected				
	3	Toward Os				
5 POSITION OF HEAD	1	Toward Ss	1 Erect	2 Tilted	3 Nod "YES"	4 Nod "NO"
	2	Undirected				
	3	Toward Os				
6 POSITION OF EYES	1	Toward Ss	1 Static	2 Moving		
	2	Undirected				
	3	Toward Os				
7 POSITION OF MOUTH	1	Closed	1 ⌣	2 —	3 ⌢	
	2	Open				
	3	Moving				

Nonverbal Dependent Variables

Variable	Variable Description	Behavior Number(s)
One	Total Body Position	Basic Category 1
Two	Body Position, Toward Ss	111-114
Three	Body Position, Standing Unerect Toward Ss and Sitting Unerect Toward Ss	112 and 114
Four	Total Spatial Relationship	Basic Category 2
Five	Total Position of Arms	Basic Category 3
Six	Position of Arms Toward Ss	311-314
Seven	Position of Arms, Close to Body Toward Ss and Extended Toward Ss	311 and 312
Eight	Total Position of Hands	Basic Category 4
Nine	Position of Hands, Toward Ss	411-413
Ten	Total Position of Head	Basic Category 5
Eleven	Position of Head, Toward Ss	511-514
Twelve	Position of Head, Nod "YES"	513, 523, 533
Thirteen	Total Position of Eyes	Basic Category 6
Fourteen	Position of Eyes, Toward Ss	611 and 612
Fifteen	Position of Eyes, Toward Ss Static	611
Sixteen	Position of Eyes, Toward Ss Moving	612
Seventeen	Total Position of Mouth	Basic Category 7
Eighteen	Position of Mouth, ‿Closed, ‿Open and ‿Moving	711, 721, 731
Nineteen	The combined Toward Ss Behaviors	111-114, 311-314, 411-413, 511-514, 611-612
Twenty	Total Behaviors	Basic Categories Numbers 1-7

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